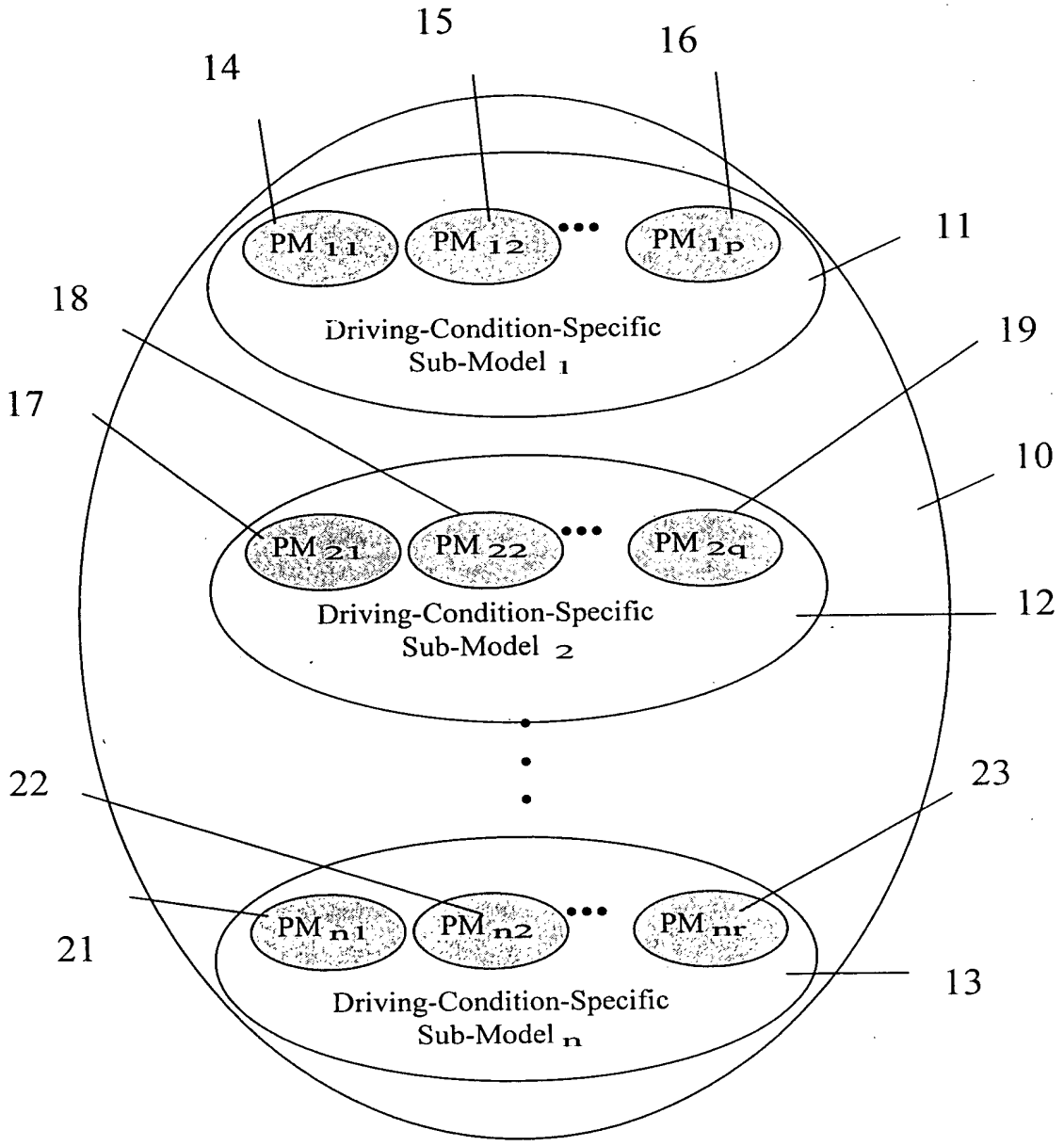
15
16
14
PM 11
PM 12
PM 1p
11
18
Driving-Condition-Specific
Sub-Model 1
19
17
10
PM 21
PM 22
PM 2q
12
Driving-Condition-Specific
Sub-Model 2
22
23
PM n1
PM n2
PM nr
21
13
Driving-Condition-Specific
Sub-Model n

FIG. 1

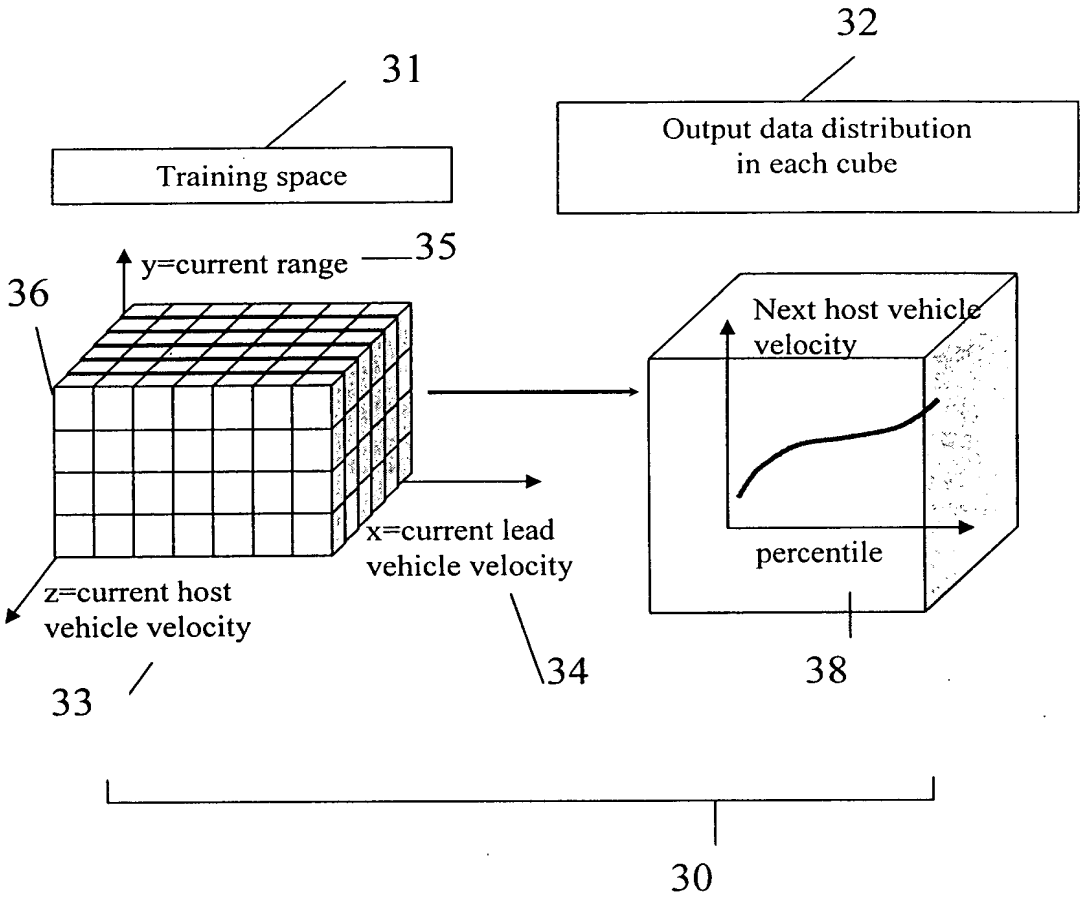
32
31
Training space
Output data distribution
in each cube
y=current range
35
36
Next host vehicle
velocity
x=current lead
vehicle velocity
percentile
z=current host
vehicle velocity
34
38
33
30

FIG. 2

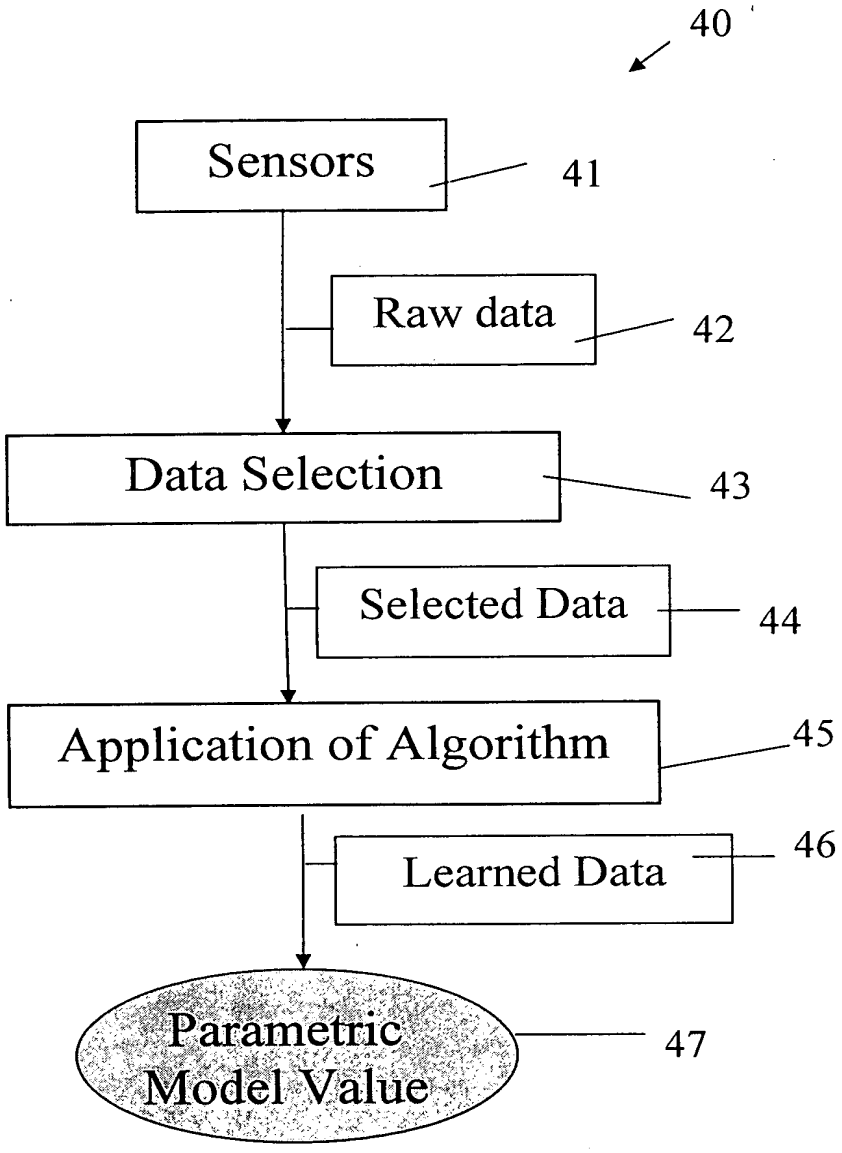
40
Sensors
41
Raw data
42
Data Selection
43
Selected Data
44
Application of Algorithm
45
Learned Data
46
Parametric Model Value
47

FIG. 3

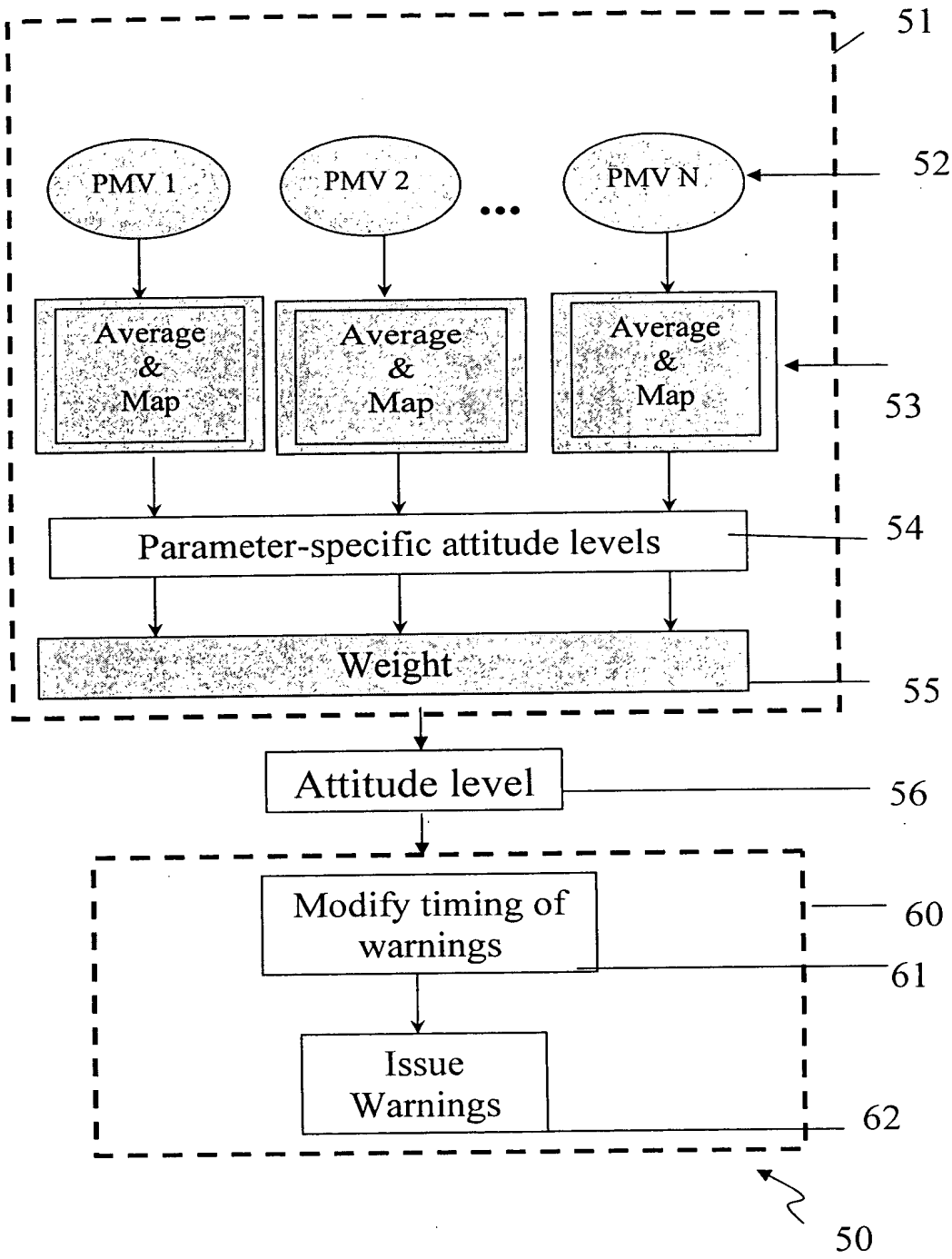
51
PMV 1
PMV 2
...
PMV N
52
Average & Map
Average & Map
Average & Map
53
Parameter-specific attitude levels
54
Weight
55
Attitude level
56
Modify timing of warnings
60
61
Issue Warnings
62
50

FIG. 4

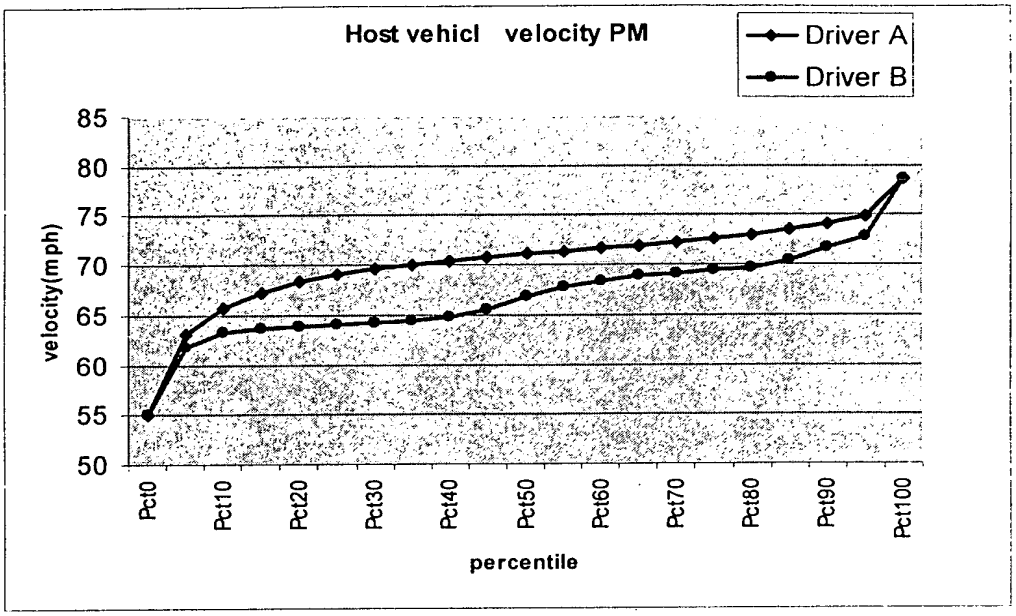
Host vehicl velocity PM
Driver A
Driver B
85
80
75
70
65
60
55
50
velocity(mph)
Pct0
Pct10
Pct20
Pct30
Pct40
Pct50
Pct60
Pct70
Pct80
Pct90
Pct100
percentile

Fig. 5A

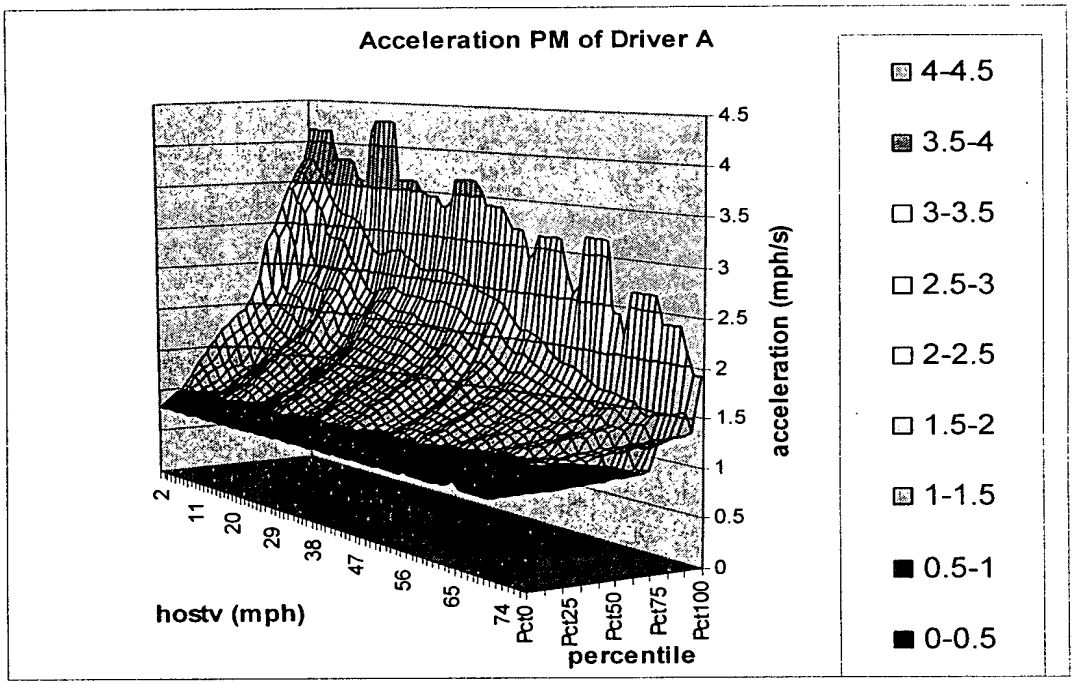
Acceleration PM of Driver A
4-4.5
3.5-4
3-3.5
2.5-3
2-2.5
1.5-2
1-1.5
0.5-1
0-0.5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
acceleration (mph/s)
2
11
20
29
38
47
56
65
74
hostv (mph)
Pct0
Pct25
Pct50
Pct75
Pct100
percentile

FIG. 5B

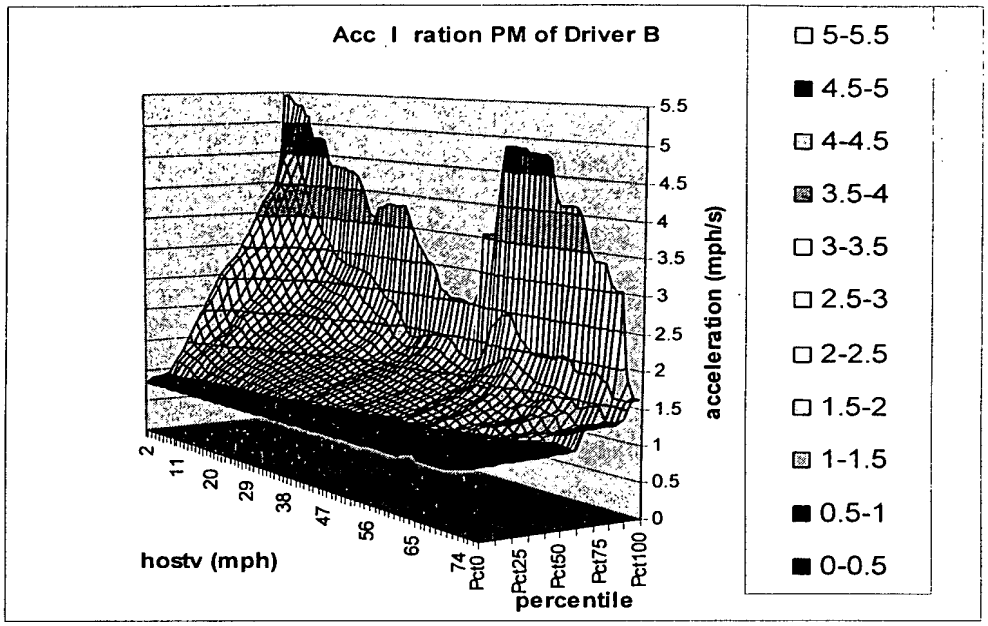
Acc l ration PM of Driver B
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
acceleration (mph/s)
2
11
20
29
38
47
56
65
74
hostv (mph)
Pct0
Pct25
Pct50
Pct75
Pct100
percentile
5-5.5
4.5-5
4-4.5
3.5-4
3-3.5
2.5-3
2-2.5
1.5-2
1-1.5
0.5-1
0-0.5

FIG. 5C

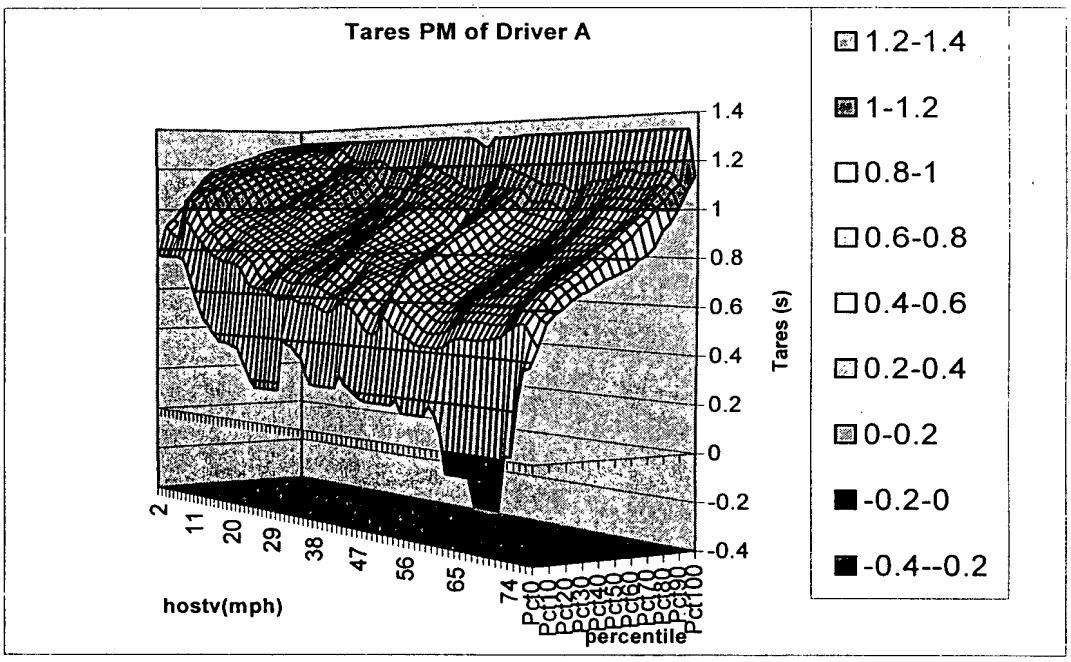
Tares PM of Driver A
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
Tares (s)
2
11
20
29
38
47
56
65
74
hostv(mph)
Pct0
Pct10
Pct20
Pct30
Pct40
Pct50
Pct60
Pct70
Pct80
Pct90
Pct100
percentile
1.2-1.4
1-1.2
0.8-1
0.6-0.8
0.4-0.6
0.2-0.4
0-0.2
-0.2-0
-0.4--0.2

FIG. 5D

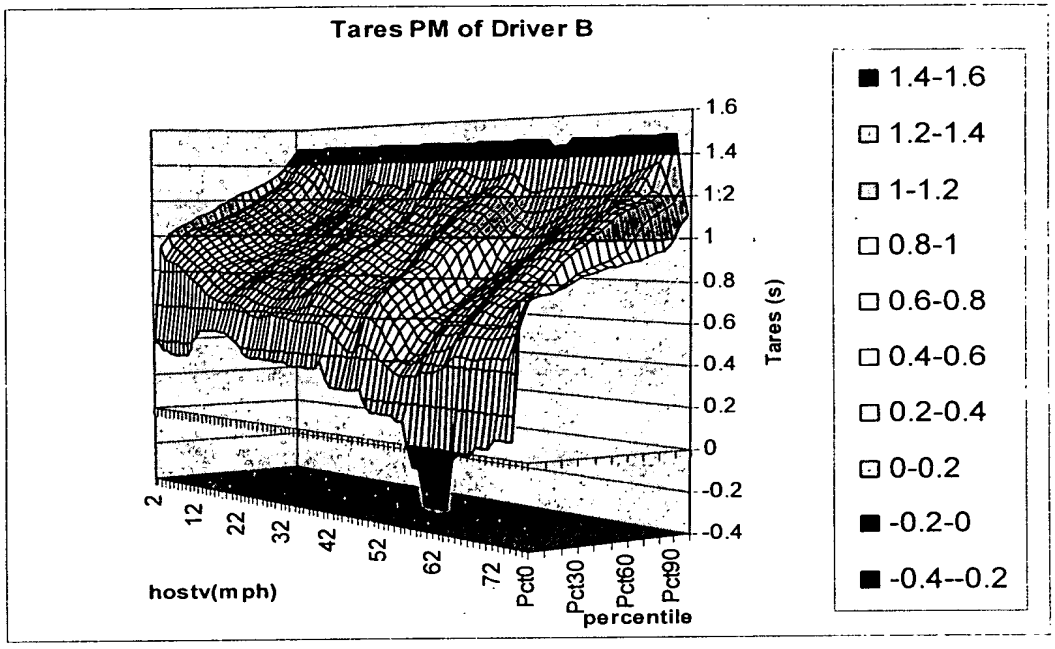
Tares PM of Driver B
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
Tares (s)
2
12
22
32
42
52
62
72
hostv(mph)
Pct0
Pct30
Pct60
Pct90
percentile
1.4-1.6
1.2-1.4
1-1.2
0.8-1
0.6-0.8
0.4-0.6
0.2-0.4
0-0.2
-0.2-0
-0.4--0.2

FIG. 5E

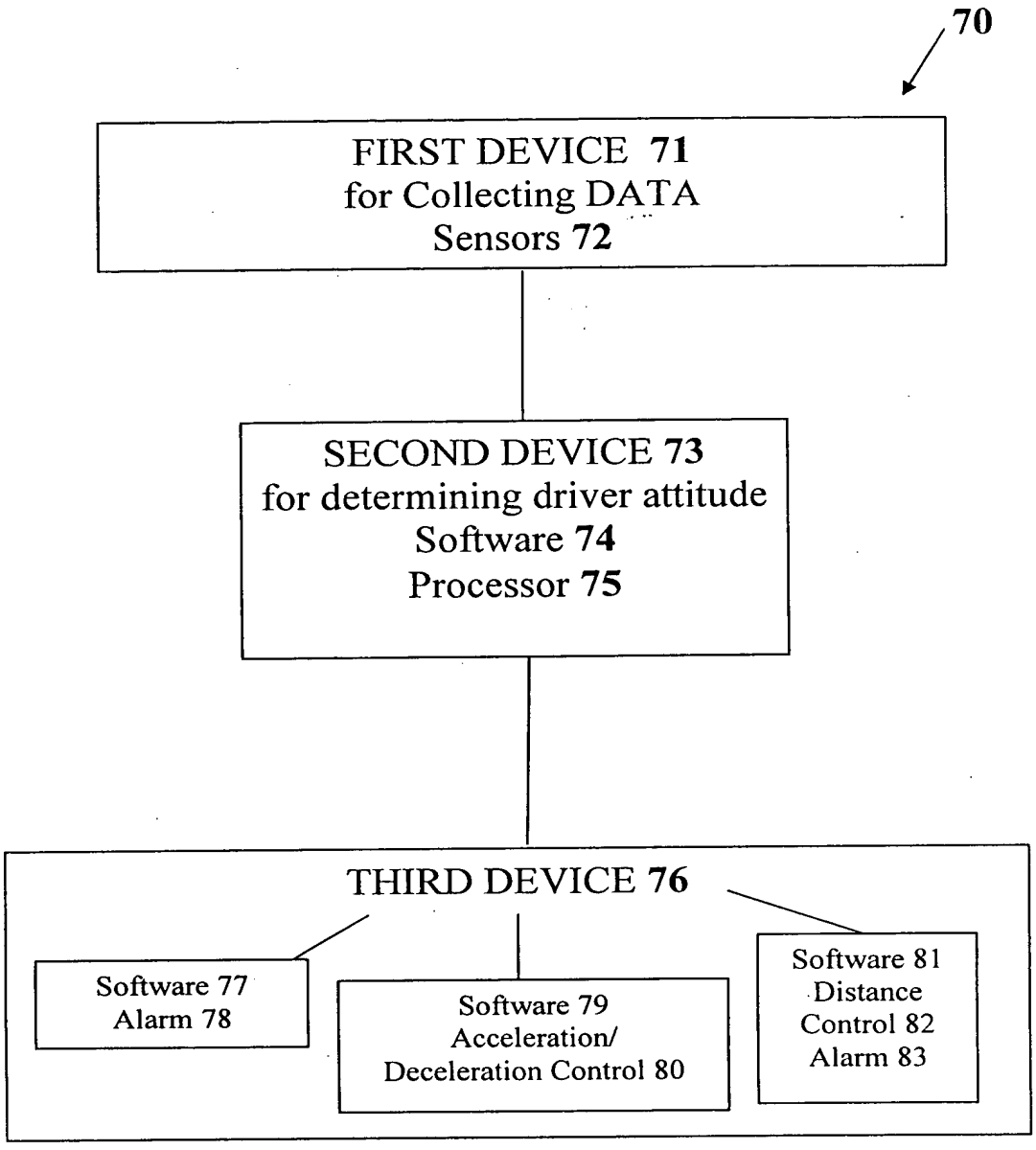
70
FIRST DEVICE 71
for Collecting DATA
Sensors 72
SECOND DEVICE 73
for determining driver attitude
Software 74
Processor 75
THIRD DEVICE 76
Software 77
Alarm 78
Software 79
Acceleration/
Deceleration Control 80
Software 81
Distance
Control 82
Alarm 83

FIG. 6